Spintronics

Special Topic Seminar

By

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Motivation

- The automatic synthesis of a SISO and MIMO QFT controllers is still an open problem.
- The most successful method for such a design takes into consideration the non-linear/non-convex QFT bounds without any approximation.
- It thereby ensures closed loop stability of the system, and becomes largely independent of the initial controller solution.
- Magnetic Levitation system is subjected to many external disturbances.
- It is highly nonlinear system.

Outline

Introduction to Magnetic Levitation Setup

Schematic of Magnetic Levitation Experimental Setup

Sensor Linearization for Lower Magnet and Coil

Table: Raw Sensor Data for Lower SISO case

Magnet position (cm)	**Raw Sensor Output y_{1raw}(counts)**
0	27900
0.5	22700
1	18300
2	12000
3	8200
4	5800
5	4100
6	2800

Sensor Nonlinearity

$$
\begin{aligned}
y_{ical} &= \frac{e_i}{y_{iraw}} + \frac{f_i}{\sqrt{y_{iraw}}} + g_i + h_i y_{iraw} \\
e_1 &= -11347, f_1 = 713.5441, g_1 = -2.9904, h_1 = -2.5283 * 10^{-5} \\
e_2 &= 7109.4, f_2 = -581.75, g_2 = 1.8355, h_2 = 4.1371 * 10^{-5}
\end{aligned}
$$

Thank You...